

REMARKS

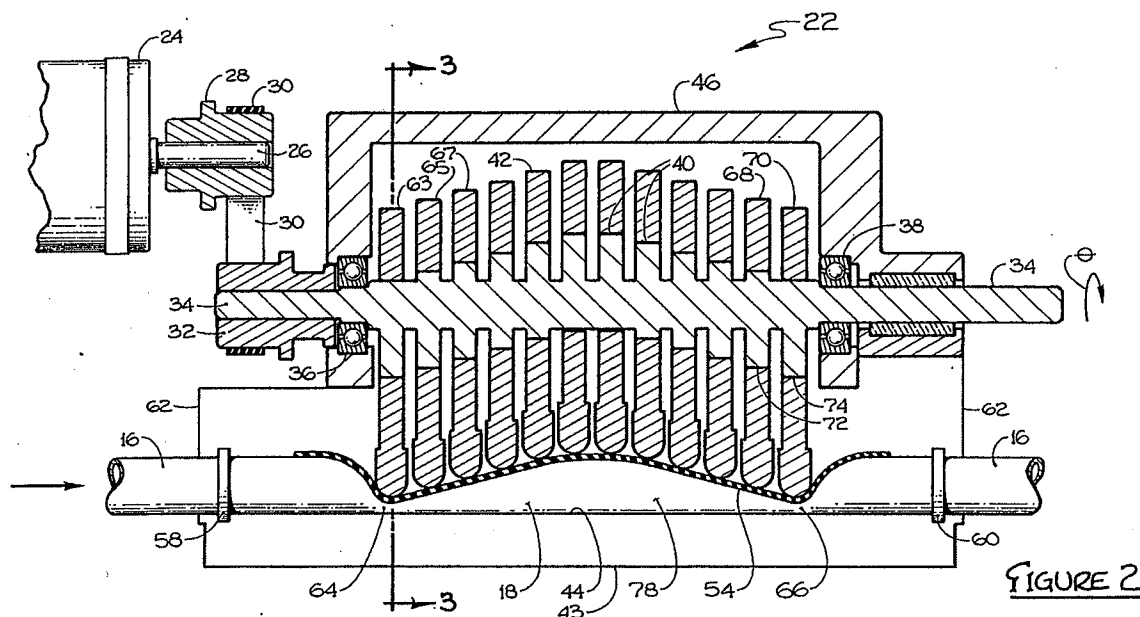
Claims 1, 3-9 and 11-37 stand rejected. By this paper, Applicant has amended Claims 1, 5, 11, 16-18, 21, 25, and 30. No new matter has been added. Thus, Claims 1-3, 5-9, and 11-37 are presented for reconsideration and further examination.

I. Discussion of the Rejection of the Claims under 35 U.S.C. § 102(b)

The Examiner rejected Claims 21, 22, 24-26, and 35-37 as being anticipated by Kaplan (U.S. Patent No. 4,909,710). Applicant respectfully submits that, as stated in the M.P.E.P. at § 2131, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). Further, the elements must be “arranged and combined in the same way as recited in the claims, not merely in a particular order.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008). Applicant respectfully submits that Kaplan fails to describe at least one feature of each of Claims 21, 22, 24-26, and 35-37.

Claim 21, as amended, recites, among other things, “shaft has a continuous core region having a diameter less than 3 mm, and wherein there exists a first imaginary cylinder of a diameter of less than 3 mm arranged along an imaginary line running through the rotational axis in the region of the cams that is contained within the shaft and a second imaginary cylinder of 3 mm or less arranged along an imaginary line running through the rotational axis in the region of the cams that is not contained within the shaft.” Independent Claim 25 recites a substantially similar feature. Applicant respectfully submits that this feature is not disclosed by Kaplan.

Kaplan generally discloses “peristaltic pumps which are used to pump fluid through resilient tubes.” *Kaplan* at col. 1, lines 5-7. With respect to Figure 2, reproduced below, Kaplan discloses that “[i]ntegrally connected onto camshaft 34 at predetermined locations along the axis of the camshaft 34 is a series of cam lobes 40. As will be appreciated by those skilled in the pertinent art, cam lobes 40 are eccentrically mounted on camshaft 34 in a helical pattern along the axis of the camshaft 34.” *Id.* at col. 4, lines 10-15.



The Office Action stated that “Kaplan discloses ... the shaft having a continuous core region of less than 3 mm (the inner-most 3 mm is considered the continuous core region.)” *Office Action* at p. 2. Applicant respectfully submits that Kaplan is silent with respect to the size of the camshaft or the cam lobes. Regardless, Applicant respectfully submits that Kaplan does not disclose a shaft for which “there exists a first imaginary cylinder of a diameter of less than 3 mm arranged along an imaginary line running through the rotational axis in the region of the cams that is contained within the shaft and a second imaginary cylinder of 3 mm or less arranged along an imaginary line running through the rotational axis in the region of the cams that is not contained within the shaft” as recited in Claims 21 and 25.

Claim 35 recites, among other things, “the ratio between the outside diameter and the stroke is less than 4:1.” Applicant respectfully submits that Kaplan fails to disclose this feature.

Page 21, lines 34-35, of the originally filed specification describes an “outside diameter d around which the rotating cam segments run.” The specification further states that the “outside diameter d corresponds approximately to a lamella height or the inside diameter of the passage orifice 15 through a lamella.” Figures 13-16, reproduced below, illustrate the outside diameter d .

Page 20, lines 7-9, of the originally filed specification state that “the stroke h can be determined, that is to say the dimension by which the lamellae are moved to and fro at a maximum.” With respect to the shaft, the stroke can be envisioned as the distance between the

outer edge of a cam segment to the inner edge of the opposite cam segment. Figures 13-16 also illustrate the stroke h .

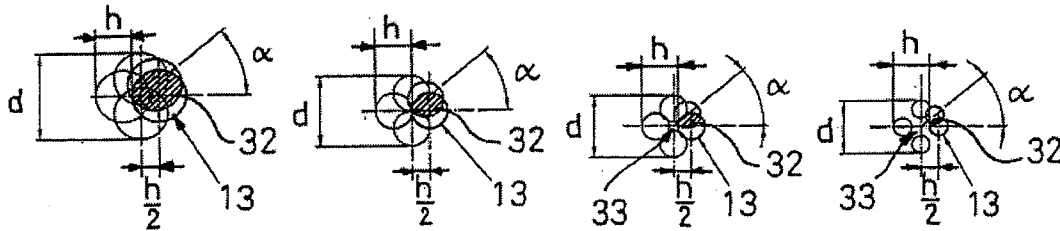


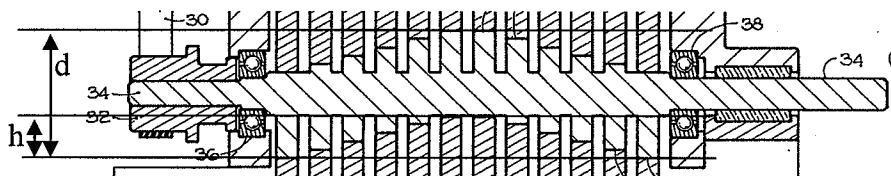
Figure 13

Figure 14

Figure 15

Figure 16

The outer diameter and the stroke of Kaplan are further illustrated in the reproduction of Figure 2 of Kaplan below. Applicant respectfully submits that Kaplan is silent with respect to the ratio between the outside diameter and the stroke. Although the Office Action stated that “the stroke/diameter appear to be equal to another in a 1:1 ratio,” this is unsupported by Kaplan. Further, Applicant respectfully submits that, as stated in the M.P.E.P. at § 2125, “it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000).



Kaplan - Figure 2 (cropped and modified by notation of h and d)

Thus, Applicant respectfully submits that Kaplan does not disclose a shaft for which “the ratio between the outside diameter and the stroke is less than 4:1” as recited in Claim 35.

In view of the above, Applicant respectfully submits that Claims 21, 25, and 35 are not anticipated by Kaplan. Claims 22, 24, 26, 36, and 37 depend on one of the above-discussed independent claims and are, therefore, also not anticipated by Kaplan. Accordingly, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 102(b).

II. Discussion of the Rejection of the Claims under 35 U.S.C. § 103(a)

The Examiner rejected Claims 1, 3-9, 11-37 under 35 U.S.C. § 103(a) as being unpatentable over Magnus (U.S. Patent No. 5,558,507) in view of Itabashi et al (U.S. Patent No.

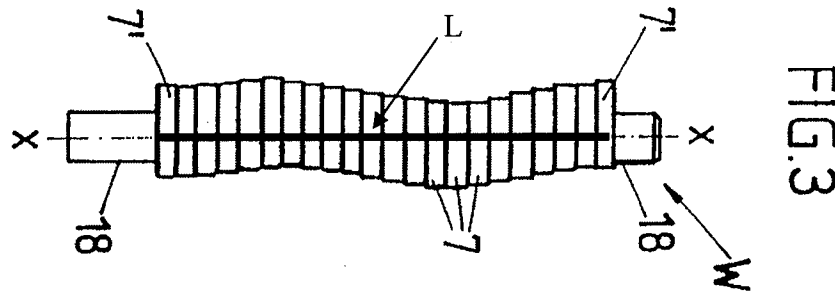
5,676,192) or Nakamura et al (U.S. Patent No. 5,778,530) or Smith et al (U.S. Patent No. 6,289,764). Applicant respectfully submits that, as stated in the M.P.E.P. at § 2143, “The rationale to support a conclusion that the claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art.” *KSR v. Teleflex*, 550 U.S. at 398, 82 USPQ2d at 1395. Applicant further submits that the cited references fail to describe at least one feature of each of Claims 1, 3-9, and 11-37.

A. Claims 1, 3-9, and 11-20

Claim 1 is directed to a pumping apparatus that includes, for example, “a one-piece shaft comprising a single homogenous piece of material with integral cams.” Claim 1, as amended, also recites “the shaft is without a core region” and “there exists an imaginary line running through the rotational axis in the region of the cams that does not contact the shaft.” Independent Claims 5, 11, and 16-18 each recite substantially similar features. Applicant submits that the applied art fails to teach or suggest the above features.

Magnus generally discloses a shaft “made up of stub shafts (8) which project on one size (a) of an eccentric disk (7) and engage in corresponding recesses (9) in the adjacent eccentric disk (7).” *Magnus* at col. 1, lines 37-41. Magnus discloses that the “helically protruding eccentric disks 7 rotate about a common axis x—x. This axis extends vertically, as does the course of the hose. The common axis x—x results from a coaxial addition of stub shafts 8 in the vertical direction.” *Id.* at col. 4, lines 34-38.

As can be seen in Figure 3 of Magnus, reproduced below, an imaginary line (L) running through the common axis x—x in the region of the stub shafts does contact the shaft. Accordingly, Magnus does not disclose “the shaft is without a core region” and “there exists an imaginary line running through the rotational axis in the region of the cams that does not contact the shaft” as recited in Claim 1.



Magnus – Figure 3 (modified by addition of line L)

Likewise, Itabashi, Nakamura, Smith, fail to disclose a shaft without a core region for which “there exists an imaginary line running through the rotational axis in the region of the cams that does not contact the shaft.” Itabashi discloses a “cam shaft body 6 including ... a plurality of shaft portions 3.” *Itabashi* at col. 2, lines. 18-19. Applicant respectfully submits that an imaginary line running through the rotational axis in the region of the shaft portions would contact the cam shaft body. Nakamura discloses a camshaft manufacturing method to produce a camshaft 1 having cam lobes 2. *Nakamura* at Figure 1 and col. 1, lines 44-46. Applicant respectfully submits, as illustrated in Figure 1, that an imaginary line running through the rotational axis in the region of the cam lobes would contact the camshaft. Smith discloses “a camshaft shaft comprising a central shaft, having concentric journal bearings and eccentric cams.” *Smith* at col. 2, lines 2-3. Applicant respectfully submits that an imaginary line running through the rotational axis in the region of the eccentric cams would contact the central shaft. Accordingly, none of the applied art references teaches or suggests a shaft “without a core region” for which “there exists an imaginary line running through the rotational axis in the region of the cams that does not contact the shaft” as recited in Claim 1.

Each of independent Claims 1, 5, 11, and 16-18 recite, among other things, “the shaft is without a core region” and “there exists an imaginary line running through the rotational axis in the region of the cams that does not contact the shaft.” Applicant respectfully submits that the applied art fails to teach, at least, these features. Thus, Applicant respectfully submits Claims 1, 5, 11, and 16-18 contain patentable subject matter and are allowable for at least this reason.

Claims 3-4, 6-10, 12-15, and 19-20 depend, either directly or indirectly, from one of the above-discussed independent claims. In view of the patentability of their respective base claims and the additional features recited therein, Applicant respectfully submits that the dependent

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claims are likewise in condition for allowance. Therefore, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 103(a) of Claims 1, 3-9, and 11-20.

B. Claims 21-34

Claim 21 recites “a one-piece shaft comprising a single homogenous piece of material with integral cams.” Claim 21, as amended, further recites “the shaft has a continuous core region having a diameter less than 3 mm” and “there exists a first imaginary cylinder of a diameter of less than 3 mm arranged along an imaginary line running through the rotational axis in the region of the cams that is contained within the shaft and a second imaginary cylinder of 3 mm or less arranged along an imaginary line running through the rotational axis in the region of the cams that is not contained within the shaft.” Independent Claims 25 and 30 recite substantially similar features. As noted above, Claims 21, 25, and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Magnus in view of Itabashi or Nakamura or Smith. Applicant respectfully submits that the applied art fails to teach or suggest a shaft having “a continuous core region having a diameter less than 3 mm” wherein “there exists a first imaginary cylinder of a diameter of less than 3 mm arranged along an imaginary line running through the rotational axis in the region of the cams that is contained within the shaft and a second imaginary cylinder of 3 mm or less arranged along an imaginary line running through the rotational axis in the region of the cams that is not contained within the shaft.”

The Office Action stated “the core region is interpreted to be the innermost 3 mm of the spinning shaft.” *Office Action* at p. 6. Applicant respectfully submits that Magnus, Itabashi, Nakamura, and Smith are silent with respect to the size of the disclosed components. Thus, the applied art fails to disclose that a “spinning shaft” has an “innermost 3 mm.” The applied art also does not disclose that the “spinning shaft” lacks an “innermost 3 mm.”

Regardless, Applicant respectfully submits that the applied art does not disclose a shaft for which “there exists a first imaginary cylinder of a diameter of less than 3 mm arranged along an imaginary line running through the rotational axis in the region of the cams that is contained within the shaft and a second imaginary cylinder of 3 mm or less arranged along an imaginary line running through the rotational axis in the region of the cams that is not contained within the shaft” as recited in Claims 21, 25, and 30.

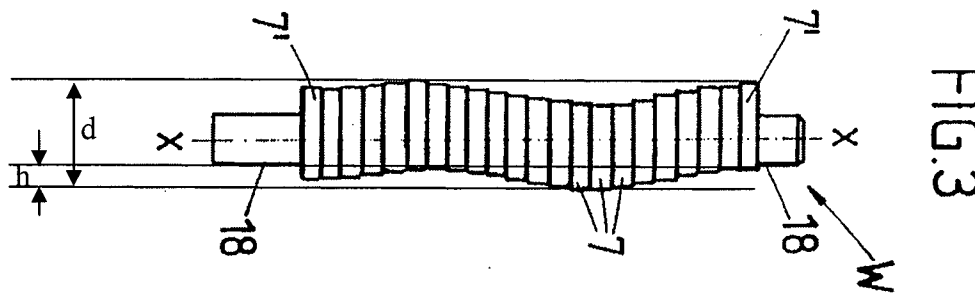
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Thus, Applicant respectfully submits Claims 21, 25, and 30 contain patentable subject matter and are allowable for at least this reason. Claims 22-24, 26-29, and 31-34 depend, either directly or indirectly, from one of the above-discussed independent claims. In view of the patentability of their respective base claims and the additional features recited therein, Applicant respectfully submits that the dependent claims are likewise in condition for allowance. Therefore, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 103(a) of Claim 21-34.

C. Claims 35-37

Claim 35 is directed to a pumping apparatus that includes, for example, “a one-piece shaft comprising a single homogenous piece of material with integral cams.” Claim 35 recites “the ratio of outside diameter to the stroke is less than 4:1.” As noted above, Claim 35 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Magnus in view of Itabashi or Nakamura or Smith.

The outer diameter and the stroke of Magnus are further illustrated in the reproduction of Figure 3 of Magnus below. Applicant respectfully submits that Magnus is silent with respect to the ratio between the outside diameter and the stroke. Although the Office Action stated that “the stroke/diameter of Magnus appear to be equal to one another in a 1:1 ratio or with some cams it appears that the outer diameter to stroke ratio is less than 1:1,” this is unsupported by Magnus. Further, Applicant respectfully submits that, as stated in the M.P.E.P. at § 2125, “it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000). Thus, Applicant respectfully submits that Mangus does not disclose a shaft for which “the ratio between the outside diameter and the stroke is less than 4:1” as recited in Claim 35.



Magnus – Figure 3 (modified by notation of h and d)

The Office Action also stated that “it would have been obvious to one having ordinary skill in the art at the time the invention was made to have this ratio be less than 4:1 since the claimed values are merely an optimum value.” Applicant respectfully submits that a *prima facie* case of obviousness with respect to ranges only applies “where the claimed ranges ‘overlap or lie inside ranges disclosed by the prior art.’” See M.P.E.P. at § 2144.05.I. Applicant further submits that the claimed range of “less than 4:1” does not “overlap or lie inside ranges disclosed by the art.” In fact, the applied art does not disclose any specific ratio regarding the outside diameter to the stroke. Thus, Applicant respectfully submits that a *prima facie* case of obviousness with respect to Claim 35 cannot be established on the basis of these references.

Applicant also submits that, as stated in the M.P.E.P. at § 2144.05.II.B, “A particular parameter must first be recognized as a results-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.” *In re Antonie*, 559 F.2d 618 (CCPA 1977). Applicant respectfully submits that the ratio between the outside diameters and the stroke is not “recognized as a results-effective variable” in the prior art.

Applicant also reiterates that, as stated in the M.P.E.P. at § 2143, “The rationale to support a conclusion that the claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art.” *KSR*, 550 U.S. 398. Applicant respectfully submits that the evidence of record does not establish a known method by which the prior art could be modified to result in the claimed ratio. In particular, Applicant respectfully submits that the claimed ratio is not enabled by the prior art.

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For at least the above reasons, Applicant respectfully submits Claim 35 contains patentable subject matter and are allowable for at least this reason. Claims 36 and 37 depend on Claim 35. In view of the patentability of Claim 35 and the additional features recited therein, Applicant respectfully submits that the dependent claims are likewise in condition for allowance. Therefore, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. § 103(a) of Claims 35-37.

CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims, and that those claims are in condition for allowance. Accordingly, early issuance of a Notice of Allowance is most earnestly solicited.

Any remarks in support of patentability of one claim should not be imputed to any other claim, even if similar terminology is used. Additionally, any remarks referring to only a portion of a claim should not be understood to base patentability on solely that portion; rather, patentability must rest on each claim taken as a whole.

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

The undersigned has made a good faith effort to respond to all of the noted rejections and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if an issue requires clarification, the Examiner is respectfully requested to call Applicant's attorney in order to resolve any such issue promptly.

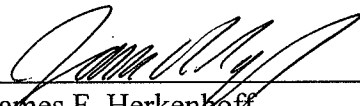
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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: 11/18/10

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